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# ShopComm: Community-Supported Online Shopping for Older Adults

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**Abstract.** The United Kingdom has an ageing population whose members experience significant life transitions as they grow older, for example, losing mobility due to deteriorating health. For these adults, digital technology has the potential to sustain their independence and improve their quality of life. However older adults can be reluctant to use digital solutions. In this paper, we review a local charity providing a grocery shopping service for older adults who are unable to go themselves. We explore how older adults perceive the benefits and drawbacks of both physical and digital shopping. Using these insights, we designed ShopComm to enable and support older adults with mobility impairments to shop online.

**Keywords.** Online shopping, service design, bespoke device, older adults, computer security, user-centred design.

## 1. Introduction

The population of the United Kingdom is ageing. The Government predicts that over 70% of the population growth in the country will be within the 60+ age group between 2014 and 2039 [1]. Life transitions associated with growing older include spouses or significant others passing away, deterioration of mobility, and moving to supported accommodation [2]. Many of these transitions result in a lack of independence, or an increase in isolation [3], and affect the ability of older adults to engage in everyday activities like going to the shop.

Technology provides an opportunity to improve the quality of life of older adults by giving them access to services available online, such as shopping and paying bills. Such services may be out of reach for many older adults who do not feel competent or safe dealing with technology [2]. Factors that influence whether they would adopt new technology include the perceived value of it, the risks of using it, and the existing habits of the individual [4]. Despite that, older adults have been seen to adopt technology in the pursuit of maintaining their independence and autonomy [2].

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A local solution to help older adults with deteriorating health or mobility issues buy groceries is a service called Food Train. The service relies on the assistance of volunteers who visit the older adults' homes every Monday to collect a paper-based shopping list. The volunteers not only purchase and deliver the goods, but also put them in cupboards, loosen jar lids, and even spend personal time with their clients.

The authors recognise that Food Train is important for some older adults - not only for providing a means to grocery shop, but also by facilitating social contact, which is crucial in maintaining good mental health [5]. However, Food Train currently operates via a paper-based system and limits their services to only three supermarkets, with no ability for the user to compare prices. This paper proposes utilising digital technology to extend the Food Train service by increasing the number of affiliated food shops, enabling price comparisons between the shops and expanding the range of goods that can be ordered. With the user being able to shop more freely and widely, they should gain greater 'perceived control' over the experience [6].

## **2. Methods**

Previous research has highlighted the importance of considering the usability of technology to support older adults [7, 8]; however, this study was design-led and did not focus on the finer details of the user interface, but rather the main aim of this study was to identify an appropriate method to enable and support older adults to shop online, thus promoting a higher level of independence. Ethical approval was received for all aspects of this research before work commenced. Consent was given by participants to use their data and images.

### *2.1. Participants*

Two men aged 54 and 51, and a woman aged 19, with 25+, 5, and 2 years of experience working with older adults, respectively, were recruited to take part in the interviews. Seven older adults, aged between 72 and 87 years old, were recruited to take part in a focus group and a follow-up feedback session in which a design solution was evaluated. Three of the older adults had previously shopped online and all were familiar with technology.

### *2.2. Materials*

The interviews, focus group, and feedback session were all recorded. In order to guide the discussion and enable brainstorming on the part of the participants during the focus group, three sets of cards were developed (Figure 1). They included a set of personas, scenarios and an array of technologies.



**Figure 1.** (A) Our personas, (B) an example scenario, and (C) an example tech card.

**Persona Cards** – Three personas were created to assist the focus group participants in visualising the potential users of the system. The three personas captured some issues highlighted during the interviews. These included diminished independence, online security concerns, and limited understanding of common online practices and terminologies. Each persona was also given a profile picture, accommodation type, a background story, motivation for shopping online, and a perceived rationale for the avoidance of shopping online.

**Scenario Cards** – Informed by the interviews, three scenarios were developed that depicted situations where the personas could benefit from shopping online. The first scenario explored renewing drug prescriptions online rather than visiting the chemist; the second explored the availability of online exclusive shopping deals; and the third explored buying presents for loved ones during the festive season.

**Technology Cards** – A set of technology cards were designed to highlight a range of technologies available for the design solution. There were 19 cards in total and they all included a title, a large image, and a short description. Eight cards dealt with different input methods, five cards were used for output methods, four cards showed different hardware solutions (e.g. Arduino and VR headset), and finally two cards were used to emphasise how inconspicuous the solution could be.

During the feedback session a prototype of ShopComm was used to facilitate the discussion. Further details about this prototype can be found in the Prototype Design and Development subsection in the Results section of this paper.

### 2.3. Procedure

Initial interviews were run with three participants from two local organizations that work with older adults to identify (1) current shopping practices, (2) when individuals want to transition to online shopping, and (3) what deterred individuals from shopping online.

Next, a two-hour focus group was undertaken with seven older adults. The focus group explored participants' likes and dislikes of both physical and online shopping. When it was time to discuss solutions, the personas, scenarios and technology cards were distributed around the room.

These insights were then used to generate a set of design guidelines, which informed the development of the nascent ShopComm system - a bespoke digital device aimed at enabling shopping online through the Food Train service model. ShopComm was

evaluated in a feedback session with six out of the seven participants from the focus group.

### **3. Results**

#### *3.1. Interviews with Experts*

The first interview was with a senior member of staff from the local Food Train branch, who has been working with the charity for the past five years. He indicated that many older adults subscribe to the service due to loss of mobility or deterioration of health. He further identified that older adults prefer to use this service rather than shop online because they do not like giving away their banking details. The older adults typically pay the volunteers using cash or cheque. Furthermore, the volunteers provide invaluable support to the older adults, which would be absent from conventional delivery services.

*Caledonia Housing Association* is a charity that provides homes and assistance to older adults. Two representatives were approached who provided insight into how the organisation had been actively focusing on educating their residents on the use of technology. The rationale is that by enabling residents to use technology to access the association's online services, they would be able to sustain a level of independence that they could not otherwise attain. In order to enable this type of learning, the charity had distributed iPad tablets to its residents and provided some basic training, such as how to turn the device on and off, and how to access the Internet.

Caledonia Housing Association found that the older adults initially had little or no understanding of how to use these devices, and were confused about the process of purchasing items online. For example, older adults thought that by adding an item to their 'shopping basket' they were automatically purchasing it. The older adults supported each other and reinforced the process of learning by forming a community around the technology. Many of them were motivated to learn because they wanted to have access to applications such as Skype, which could allow them to see their relatives; and the ability to shop online, which would enhance their independence.

#### *3.2. Focus Group*

In a focus group session, the older adult participants' positive and negative experiences with online and physical shopping were established. Most notably the participants viewed going to the shop as an opportunity to exercise and be sociable, to confirm the quality of the products available, and - for items of clothing - to try them for size. Negative aspects of physical shopping identified included rude staff, the lack of seating, and (too) frequently changing stock. When discussing online shopping, the participants acknowledged that the greatest benefits are those of savings of time and money enabled by easy price comparisons. Furthermore, participants recognised that being comfortable with online banking would enable users to access transaction information instantaneously, and could make the payment of bills easier via direct debits. The most notable issues with online shopping highlighted by the group were a fear of being scammed, perceived difficulties in returning items, a lack of trust in online retailers, and

limited information about the products when browsing (e.g., a photograph of an item online does not provide the same information as seeing it in person).

A discussion was initiated with the group around what might be an appropriate way to help older adults with deteriorating health shop online using the sets of cards. Security, ease of use, and diversity of retailers were identified as critical for the development of the project. With regards to security, the participants indicated that it was vital to consider which payment methods were allowed. They liked the idea of using a fingerprint scanner to verify the identity of the individual making the purchases, a functionality that would increase their trust in the security of the system. When discussing how to make the interface easy to use, the participants requested the use of plain English, helpful tips on how to use the tool, and a simple process for purchasing the items. Furthermore, they all had different preferred retailers, yet recognised that providing choice is important. The participants requested that the system allow them to filter the displayed items to the shops they most favour. Finally, the discussion turned to how retailers and services could be identified and approved for inclusion into a digital shopping system for older adults. During this discussion, the concept of a community of older adults who could share their experiences of using online retailers was proposed, and this notion was well received by the participants.

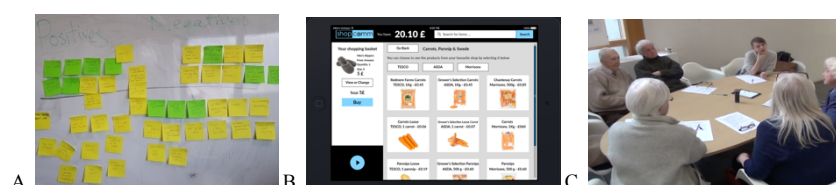
### *3.3. Prototype Design and Development*

As previously discussed, one of the limitations of Food Train is that they operate on a paper-based system limited to three supermarkets. Based upon the aforementioned research with experts and older adults, an opportunity was identified for a technology intervention to improve the services currently offered by the organisation. A bespoke touchscreen device was designed based on the Food Train service model (Figure 2b). By adopting the service design of the existing charity it could be ensured that ShopComm customers would receive a high level of care and support. Furthermore, this solution would support individuals with reduced mobility or deteriorating health, but not isolate them socially. Key issues that were considered when designing this technological solution included how to generate trust, educate users, and ease the process of shopping online.

The design itself was guided by the prioritised criteria generated through the focus group. It is apparent that trust is a significant factor in encouraging older adults to use e-services, and can increase the perceived usefulness of the service for this group [9]. Therefore, to generate trust, the users would only be able to finalise a purchase with the use of fingerprint authentication. They would also have the choice of entering their bank details, or giving a volunteer cash or a cheque to top up their account balance. To make the tool easy to use, a large sans font was selected for the device, in tandem with easy-to-understand language, and no iconography. Furthermore, an ever-present tutorial video, the subject of which would automatically change in context with the user's current page, was made available to assist anyone still unsure of the device's functionality. The shopping basket, often intermittently displayed in other user interfaces, is similarly always visible in order to keep the process of buying items as transparent as possible. To avoid the issue of requiring local WiFi access, the bespoke device was designed to support operation on mobile data networks. Also incorporated was the participants' ideas

of filtering items by shop, accessing services such as requesting a visit from one of the volunteers, and viewing past purchases.

A combination of Adobe PhotoShop and Axure RP Pro 7.0 was used to develop a high-fidelity prototype of the proposed solution. Different scenarios to explore during the evaluation were identified (e.g. finding and adding carrots to the shopping basket) and these were deployed to guide the development of a functional prototype. This approach enabled a user interface to be rapidly designed within the time constraints of the project, thus allowing timely acquisition of feedback on the usability of key features offered by the proposed system.



**Figure 2.** (A) positives and negatives of shopping, (B) Prototype of ShopComm, and (C) Feedback Session.

### 3.4. Feedback Session

The completed prototype was presented to six out of the seven participants who attended the first focus group session. The participants were positive towards the idea of a bespoke device with high security, enabled by the fingerprint scanner. Furthermore, the trust gained through this level of security meant that the older adults were keen for ShopComm to expand to include additional services, such as the ability to set up direct debits to pay bills, and enter electricity or gas meter readings. The older adults appreciated the ability to refine results and compare prices between shops, but there was a specific request for the next version of ShopComm to show special offers at the top of search results. They also wanted more control over the system by further developing a community feature of ShopComm. This included being able to request the inclusion of retailers not currently on the system, and the ability to provide feedback on the volunteers. The participants greatly emphasised that the volunteers should be vetted before becoming a part of the service. Furthermore, the participants requested that ShopComm provide functionality to request a favoured volunteer, or ban a volunteer from going to their home.

Although a help video section was included that was prominent throughout the system, the contents of which would change contextually, the participants of the feedback session were also keen to have a live video-call function for help and support. Finally, the participants expressed concerns about the use of the tool by older adults with deteriorating mental health. They felt that the service could benefit from a simplified, more limited version of ShopComm for individuals with dementia. It could have additional functionality, such as verifying orders of those individuals to limit the risk of making repeated or unnecessary purchases.

#### **4. Discussion**

The expert interviews were a necessary first step in this research and the insights gained from these were instrumental in planning the focus group. The interviews highlighted the importance of considering payment methods, the value of community and technical support, and the advantage of personal and social incentives to adopt technology.

During the focus group, it was apparent that the technology, scenario, and persona cards had limited appeal to the participants. The participants did not relate to the personas and showed little engagement with the technology cards beyond the fingerprint scanner, which the participants incorporated into their design solution to increase their confidence that it would be secure. It was unexpected that the participants did not engage with the cards, which were intended to prompt reflection on possible online shopping design solutions, and the participants greatly enjoyed sharing their personal experiences shopping online and in-store. Discouraging their enthusiasm and insights by steering the focus away from a productive discussion only to utilise the purpose-made cards seemed counterproductive to ensuring a participant-led focus group. Based on these observations it may be that there is an advantage to implementing more unstructured activities when working with older adults.

Conversely, the main issue that arose because of the unstructured approach was a difference in contribution between outspoken and more reserved participants – with more confident individuals tending to dominate the focus group. There was a pre-existing concern about influencing the participants' comments during the structured activities that were planned for the focus group and the feedback session; yet, the participants naturally directed the events into a free-flowing discussion, which meant that it was a less constrained, participant-led focus group. While using a relatively unstructured approach can increase the discovery of unexpected but interesting information, which may not be found when following a highly-structured activity, there is a risk of dominant individuals in the group using this opportunity to take control due to less structure.

What became clear during this research is that ShopComm's user friendly approach, inspired by the mostly technology-free Food Train service model, has massive potential to leverage the benefits of digital technology and e-commerce into the lives of a user group often perceived as resistant or suspicious of online transactions. The resulting design solution purposely used technology that the participants were familiar with or requested, and the resulting evaluation of the ShopComm prototype was positive overall.

#### **5. Limitations and Future Work**

Future work should begin with a plan to undertake a further, more comprehensive evaluation of the user interface. While positive feedback was received on the system's features from the focus group, this was based on a high-fidelity prototype, and did not explore the interface in depth. We will look further into navigation and iconography to see how we can increase the interaction user experience for older adults. Second, the participants requested a community feature where they could rate volunteers and request the inclusion of new retailers. The interview with Caledonia Housing Association revealed that their clients independently formed a community support system to cope



with the introduction of new technology, suggesting that building a support community into ShopComm might prove effective in fostering confidence in this new system. Third, the possibility of collaborating with Food Train to trial ShopComm with their customers appears a sensible avenue to explore in further developing the device and service. Fourth, future design iterations may benefit from exploring the benefits of conversational interfaces, which may aid older adults with higher mobility impairments. Finally, and considering demographic trends, disseminating the outcomes of this research - and the work being undertaken at Food Train - may enable or encourage others to set up similar services for older adults - thus enhancing support in a domain that can only expand in the years ahead.

## 6. Conclusion

This research focused on designing a technology-driven solution to enable and support older adults with mobility impairments to shop online. Gathering insights and experiences from two interviews with local organisations, and from two focus groups with older adults, ShopComm was designed: a bespoke digital device that enables and supports older adults to shop online with confidence. A high-fidelity prototype of the design was created and evaluated in a second focus group with older adults, who responded positively, identifying several opportunities for future work.

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